U.S. Department of Energy
Energy Efficiency and Renewable Energy

Site Design

Stephen Hamstra, P.E., LEED AP, CGD
Executive Vice President
GMB Architects-Engineers

GMB Architects • Engineers

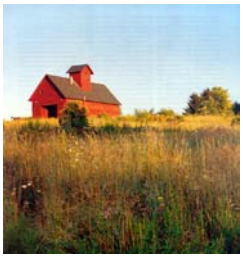
SUSTAINABLE LANDSCAPES

"When we see the land as a community to which we belong, we may begin to use it with love and respect."

Aldo Leopold

U.S. Department of Energy
Energy Efficiency and Renewable Energy

DESIGN



- Use of plants that naturally occur within the region
- Native plants have developed resistance to disease, pest, drought and therefore will survive with less care

U.S. Department of Energy
Energy Efficiency and Renewable Energy

DESIGN

- Native plantings have many advantages over exotic species
- How much should we really be mowing/maintaining

U.S. Department of Energy
Energy Efficiency and Renewable Energy

DESIGN

- Standard approach vs. natural approach
- Perceptions for natural plantings are changing

U.S. Department of Energy
Energy Efficiency and Renewable Energy

WHY NATURAL PLANTS

Aesthetics

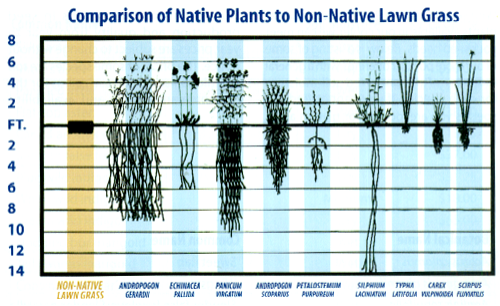
Natural landscapes are attractive and can offer seasonal interest throughout the year

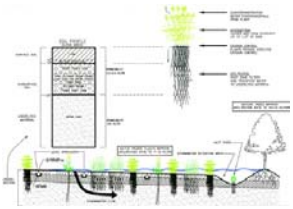
Prairie plantings can be planted in different heights, textures, colors etc.

Diversity of plantings will enhance the look

U.S. Department of Energy
Energy Efficiency and Renewable Energy

WHY NATURAL PLANTS

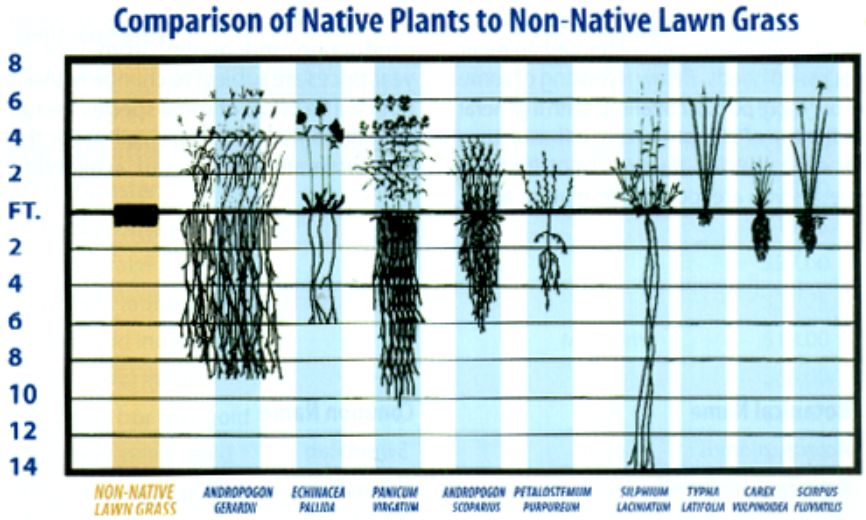




Reduced Runoff

Most turf grass plants possess very shallow root systems which are not capable of handling most rain events. Water that is not able to penetrate the soil is transported away . Native plantings have substantial root systems that filter large quantities of rain water and limit soil and fertilizers from moving offsite.

U.S. Department of Energy
Energy Efficiency and Renewable Energy



U.S. Department of Energy
Energy Efficiency and Renewable Energy

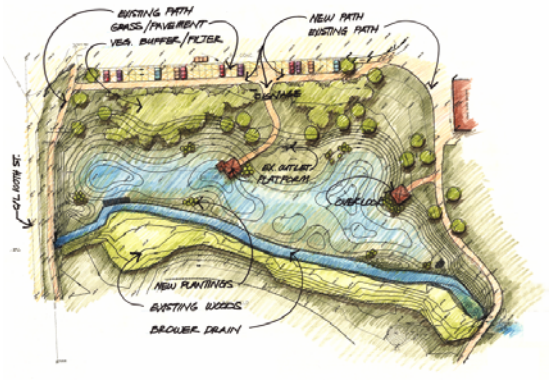
WHY NATURAL PLANTS

Wildlife

A planting scheme that includes a diverse mix of native species will create habitat for birds, insects and other animals.

U.S. Department of Energy
Energy Efficiency and Renewable Energy

WHY NATURAL PLANTS

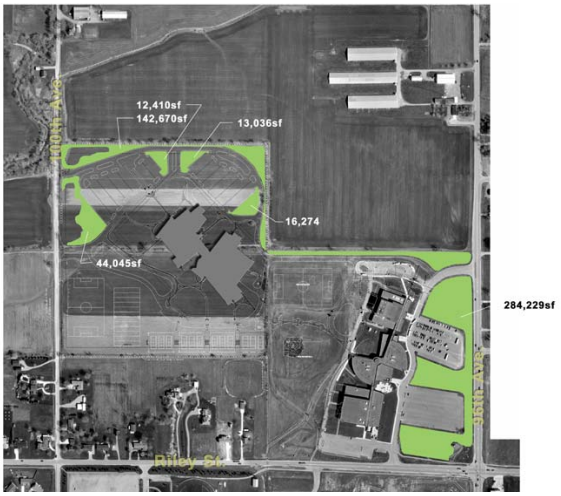


Education

By utilizing native plantings students will experience the ecosystem in which they live. Plant identification and habitat development can be incorporated into the curriculum.

U.S. Department of Energy
Energy Efficiency and Renewable Energy

WHERE?



- 11 acres of East High School & West High School
- New image to the frontage along 96th Ave.
- Including areas that are hard to mow or unused for activities and traffic

U.S. Department of Energy
Energy Efficiency and Renewable Energy

WHY NATURAL PLANTS

Zeeland Public Schools Prairie Conversion

12/16/2003

Design costs will be performed hourly and are estimated at $5000 to provide design, bid administration, and oversight of the project

Table 1: Detailed Prairie Installation Costs*

	Year1	Year2	Year3	Year4	Year5	Year6	Year7	Year8	Year9	Year10
Site Preparation	$ 3,500									
Seeding	$ 22,000									
Live Plant Plugs***	$ 25,000									
Maintenance	$ 13,000	$ 8,000	$ 7,000	$ 5,000	$ 3,000					
Controlled Burn		$ 5,000	$ 5,000	$ 5,000			$ 5,000			$ 5,000

Table 2: Comparison of Prairie vs. Turf Grass Costs

	Year1	Year2	Year3	Year4	Year5	Year6	Year7	Year8	Year9	Year10
Prairie*	$ 61,500	$ 13,000	$ 12,000	$10,000	$ 3,000		$ 5,000			$ 5,000
Turf**	$ 36,300	$ 33,300	$ 36,300	$36,300	$36,300	$36,300	$36,300	$36,300	$ 36,300	$35,300
Annual Cost Difference	$ (25,200)	$ 23,300	$ 24,300	$25,300	$33,300	$36,300	$31,300	$36,300	$ 36,300	$31,300

Table 3: Total Cost Savings to Zeeland Public Schools for 11 acre Prairie Conversion

	3-Year	5-Year	10-Year
Prairie Cost	$ 86,500	$ 99,500	$109,500
Turf Cost	$139,900	$181,500	$363,000
Total Cost Savings to ZPS	$ 22,400	$ 82,000	$253,500

*These estimated costs assume conversion of 11 acres of turf grass into prairie by JFNew and include site preparation, seeding, plant plugs, and maintenance

**Estimated annual cost of $3,300/year/acre for turf grass maintenance provided by ZPS. Costs have not been adjusted for inflation.

***Plant plug amount may vary, and may be delayed to year 2 in order to temper initial costs if desired. 9,000-10,000 plugs can be installed for this cost, depending on species

Economics

Turf:

- Need to mow
- Need to water
- Need to fertilize
- Need to maintain irrigation system

Native Plantings:

- Bi-Annual burn or mowing is required

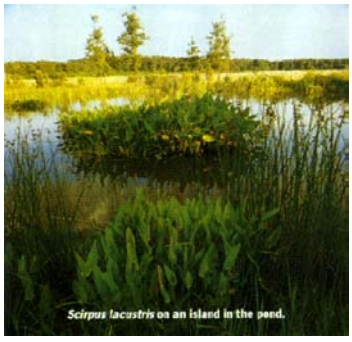
U.S. Department of Energy
Energy Efficiency and Renewable Energy

WHERE?

- Areas that are currently turf that we don't utilize for any particular purpose
- Storm detention areas
- Areas where turf has been difficult to maintain or take care of

U.S. Department of Energy
Energy Efficiency and Renewable Energy

PROCESS

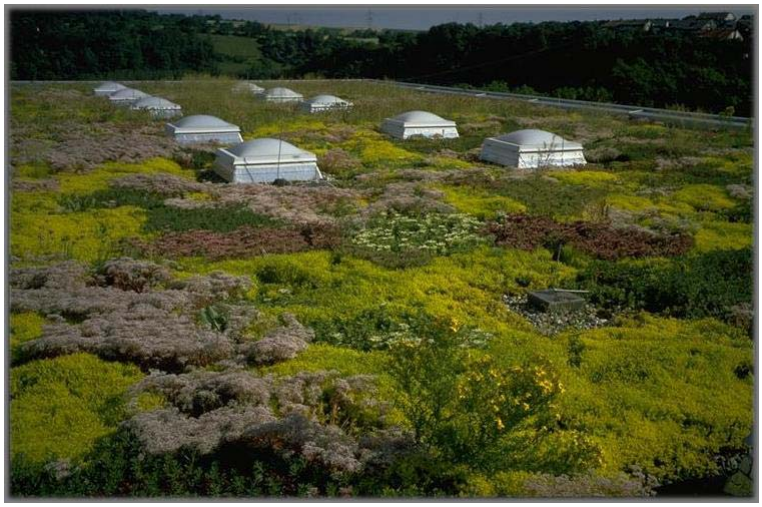


- Develop bid documents with owner input
- Take bids from qualified contractors
- Weed kill areas to be converted
- Fall planting/cultivation

But what about urban sites?

U.S. Department of Energy
Energy Efficiency and Renewable Energy

U.S. Department of Energy
Energy Efficiency and Renewable Energy



U.S. Department of Energy
Energy Efficiency and Renewable Energy

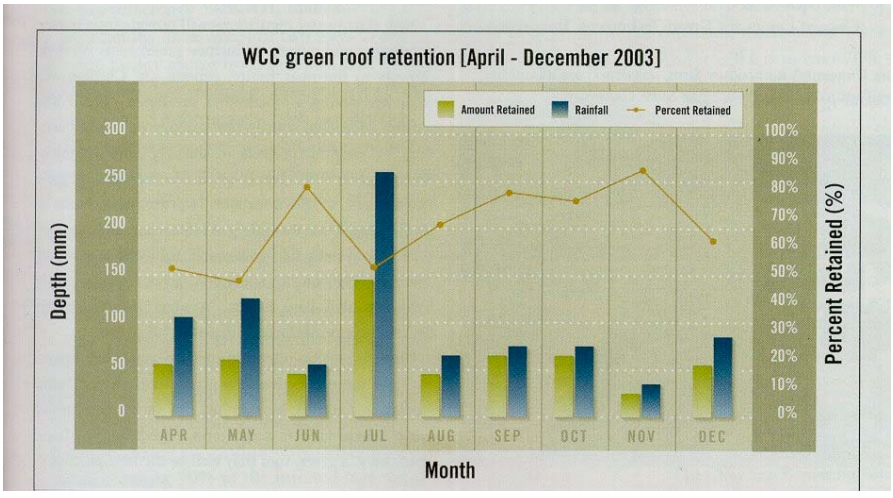
U.S. Department of Energy
Energy Efficiency and Renewable Energy

U.S. Department of Energy
Energy Efficiency and Renewable Energy

Chicago City Hall

U.S. Department of Energy
Energy Efficiency and Renewable Energy

Runoff Reduction 50% or more!



Building Design & Construction Magazine, July 2004

Questions?